

Curriculum Vitae

H. G. Perros

Department of Computer Science
North Carolina State University
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Personal Data

Married, two children
Born 13th February 1947 in Greece
American Citizen
Address: 100 Prince William Lane, Cary, NC 27511
Telephone: (919) 467-7510

Education

Ph.D.	Operations Research Trinity College, Dublin, Ireland	1971-1975
M.Sc.	Operational Research with Computing Leeds University, England	1970-1971
Diploma	Data Processing Greek Center of Productivity Athens, Greece	1969-1970
B.A.	Mathematics Athens University, Greece	1965-1970

Employment

Visiting Scientist Bell Northern Research	July '95 to June '96
Visiting Professor Lab. MASI, Univ. Paris 6, France	Jan.to June '89
Visiting Scientist Bell Northern Research	Sept.to Dec. '88
Professor Department of Computer Science	since July '88

North Carolina State University

Associate Professor
Department of Computer Science
North Carolina State University

1982 - 1988

Visiting Professor
INRIA, Paris, France

Sept.to Dec. '79

Assistant Professor
Department of Quantitative Methods
Univ. of Illinois at Chicago

1976-1982

PUBLICATIONS

Refereed Journal papers

1. "Modelling a disc I/O system: A queue network approach," *European J. Opt. Res.*, 1 (1977), 139-145.
2. "On the blocking process in queue networks," with F. G. Foster, *European J. Oper. Res.*, 5 (1980), 276-283.
3. "Hierarchical queue networks with partially shared servicing," with F. G. Foster, *J. Operational Research Society*, 30 (1979), 157-166.
4. "A regression model for predicting the mean file access time of a disk I/O system," *The Computer Journal*, 23 (1980), 34-36.
5. "A two-level open queue network with feedback and blocking," *R.A.I.R.O.-Recherche Operationnelle*, 15, 1981, pp. 27-38.
6. "A Symmetrical exponential open queue network with blocking and feedback," *IEEE Trans. on Software Engineering*, Vol. SE-7, July 1981, pp. 395-402.
7. "A standardized frozen-meals service for Irish schools," with J. MacAirt, *European J. Oper. Res.*, 9, 1982, pp. 248-256.
8. "The HDLC/VS protocol for satellite communications," *Computer Communications*, 5, 1982, pp. 73-78.
9. "On the $M/C_k/1$ queue," *Performance Evaluation*, Vol.3, No. 2, (1983), 83-93.
10. "A model for predicting the response time of an on-line system for electronic fund transfer," *Journal of Telecommunications Networks*, Vol. 4, 1986, pp. 73-83.

11. "Approximate analysis of open networks of queues with blocking: Tandem configurations," with T. Altioik, *IEEE Trans. on Software Engineering*, Vol. SE-12, 1986, pp. 450-461
12. "Open networks of queues with blocking: Split and merge configurations," with T. Altioik, *IIE Trans* (1986) 251-261.
13. "A queueing system where customers require a random number of servers simultaneously," with G. Y. Fletcher and W. J. Stewart, *European J. Oper. Res.*, 23, 1986, pp. 331-342.
14. "A queueing model for circuit-switching traffic in an integrated services environment," with G. Y. Fletcher and W. J. Stewart, *IEEE Trans. on Communications*, Vol. COM-34, 1986, pp. 25-30.
15. "Approximate analysis of arbitrary exponential queueing networks with blocking," with T. Altioik, *Annals of Oper. Res.* (1987) 421-509.
16. "An analytic model of a file server for bulk file transfers," with D. Mirchandani, *Computer Systems Science and Engineering J.*, Vol. 1, 1986, pp. 144-150.
17. "On equivalencies of blocking mechanisms in queueing networks with blocking," with R. Onvural, *Operations Research Letters*, (1986) 293-297.
18. "Approximate analysis of product-form queueing networks with blocking and deadlock," with A. A. Nilsson and Y. C. Liu, *Performance Evaluation J.*, 8 (1987) 19-39.
19. "Analytic and numerical solutions of an N duplicate-server model," with K.-P. Jun, *J. Operational Research Society*, 39 (1988) 949-958.
20. "A computationally efficient approximation algorithm for analyzing open queueing networks with blocking," with P. Snyder, *Performance Evaluation J.*, 9 (1988/89) 217-224.
21. "Some equivalencies between closed queueing networks with blocking," with R. Onvural, *Performance Evaluation J.*, 9 (1988/89) 111-118.
22. "Approximate throughput analysis of cyclic queueing networks with finite buffers," with R. Onvural, *IEEE Trans. Software Engineering*, 15 (1989) 800-808.
23. "Equivalencies between open and closed queueing networks with finite capacity," with R. Onvural, *Performance Evaluation J.*, 9 (1988/89) 263-269.
24. Approximation Algorithms for the Analysis of Open Queueing Networks with Blocking, Chapter in: *Stochastic Analysis of Computer and Communications Systems*, Takagi (Ed.), (North Holland, 1990), 451-498.

25. "Semaphore queues: Modelling window flow control mechanisms," with S. Fdida and A. Wilk, *IEEE Trans. Communications* 38 (1990) 309-317.
26. "Approximate analysis of tandem configuration with blocking and general services," with K.-P. Jun, *European J. of Operations Research*, 46 (1990) 123-135.
27. "Aproximate analysis of a fork/join closed queueing system," with Y.-C. Liu, *European J. Oper. Res.* 53 (1991) 382-392.
28. "A decomposition procedure for analysing a fork/join closed queueing network," with Y.-C. Liu, *IEEE Trans. Computers* 40 (1991) 365-370.
29. "A bibliography of papers on queueing networks with finite capacity queues, *Performance Evaluation J.*, 10 (1989) 255-260.
30. "Nested sliding window protocols with packet fragmentation," with G. Shapiro, *IEEE Trans. Comm.*, Jan. 1993.
31. Adaptive polling schemes for an ATM bus with bursty arrivals, with J. Karlsson and Y. Viniotis, *Computer Networks and ISDN* 24 (1992) 93-103.
32. Multichannel resource sharing systems, with G. Pujolle, *Archiwum Informatyki, Teoretycznej I Stosowanej*, 2 (1990) 79-90.
33. "Performance analysis of a multi-buffered Banyan ATM switch under bursty traffic", with Morris, *IEEE Trans. Comm.* 42 (1994) 891-895.
34. "A queueing model of a bufferless synchronous Clos ATM switch with head-of-line priority and push-out," with Nilsson and Lai, *J. High Speed Networks* 1 (1992) 255-279.
35. "Approximate analysis of a discrete-time tandem network of cut-through queues with blocking and bursty arrivals", with Morris, *Performance Evaluation J* 17 (1993) 207-223.
36. "A discrete-time queueing model of the shared buffer ATM switch with bursty arrivals", with S.-W. Hong and H. Yamashita. *Telecommunication Systems J.* 2 (1993) 1-20.
37. "Approximate analysis of discrete-time tandem queueing networks with bursty and correlated input traffic and customer loss, with Park and Yamashita. *Letters of Operations Research* 15 (1994) 95-104.
38. "Approximate analysis of a shared-medium ATM switch under bursty arrivals and nonuniform destinations" with A. Zaghloul. *Perform. Eval. J.* 21 (1994) 111-129.
It was also reprinted in: M. Toy (Ed.), *ATM Development and Applications: Selected Readings*, (IEEE, 1996), 399-417.
39. "Performance analysis of leaky bucket policing mechanisms", with D. Holtsinger, *Asian-Pacific Engineering Journal (Part A)*, vol 3, No. 3&4 (1993) 235-264.

40. "A bibliography of ATM related papers" with Onvural and Pujolle, *Annals of Operations Research*, vol 49, 1994, 347-371.
41. "Analysis of an open tandem queueing network with population constraint and constant service times", with Y. Rhee. *European J. of Operations Research*. 92 (1996) 99-111.
42. "Call admission control schemes: A review" with K. Elsayed. *IEEE Magazine on Communications*, special issue on Congestion Control, Nov. 1996, 82-91.
43. "Analysis of an ATM statistical multiplexer with heterogeneous Markovian on/off sources and applications to call admission control", with K. Elsayed. *J. of High Speed Networks*. 6 (1997) 123-139.
44. "Performance analysis of a photonic single-hop ATM switch architecture with tunable transmitters and fixed frequency receivers" with M. McKinnon and G. Rouskas, *Performance Evaluation J.* 33 (1998) 113-136.
45. "Implications of middleware and application level communications issues on the performance of network-based problem-solving environments" with R. Balay and M. Vouk. *PSE Book*, IEEE (in press).
46. "Traffic management: A review of call admission control schemes for ATM networks", with K. Elsayed. *The Froelich/Kent Encyclopedia of Telecommunications.*, Vol 17. pp75-90, Marcel Dekker.
47. "An approximate analysis of an open tandem queueing network with population constraint and constant service times" with Young Rhee. *IEE Trans.* 1998 Oct. 30 (10) 973-979.
48. "A comparative performance analysis of call admission control schemes in ATM networks", with K. Elsayed. To appear in the *the Millenium ATM book on tutorial papers*, Kluwer Press.
49. "A two-layered queueing network model with client-server type of blocking", with S. Ramesh. *Annals of OR*. MacGregor Smith, Gershwin, and Papadopoulos, eds.
50. "The superposition of discrete-time Markov renewal processes with an application to statistical multiplexing", with K. Elsayed. *Applied Mathematics and Computation* 115 (2000) 43-62.
51. "Maximizing multicast throughput in WDM networks with tuning latencies using the virtual receiver concept", with Z. Ortiz and G. N. Rouskas. To appear in a special issue on WDM of the *European Transactions on Telecommunications*.
52. "Performance analysis of broadcast WDM networks under IP traffic, with M.W. McKinnon and G. Rouskas. *Performance Evaluation J.*, vol 36-37, pp. 333-358, August 1999.

53. "Scheduling combined unicast and multicast traffic in broadcast WDM networks", with Z. Ortiz and G. N. Rouskas. To appear in the *Photonic Network Communications Journal*.
54. "A multi-layered queueing network model of a client-server system with synchronous and asynchronous messages", with S. Ramesh. To appear in *IEEE Trans. Software Engineering*.
55. "A comparison of wavelength allocation policies in wavelength routed networks", with Y. Zhou and G. Rouskas. To appear in the *Photonic Network Communications Journal*.
55. "Computing blocking probabilities in multi-class wavelength routing networks", with S. Ramesh and G. Rouskas. To appear in the *ACM Trans. On Modeling and Computer Simulation*, Special issue on *Modeling and Simulation of Communication Networks*.
56. "A path decomposition approach for computing blocking probabilities in wavelength routing networks ", with Y. Zhou, G. Rouskas. To appear in *IEEE/ACM Trans. on Networking*
57. "A survey of optical packet switching and optical burst switching techniques", with L. Xu and G. Rouskas. To appear in the *IEEE Magazine on Communications*.

Papers in refereed conferences

1. "Queue networks with blocking: Exact and approximate results," with F.G. Foster, *Operating systems: Theory and Practice*, D. Lanciaux (Ed.), pp.167-179, North Holland, 1979.
2. "Performance of some satellite communication protocols," with G. Pujolle, *Proceedings Compcon '80*, 1980, pp. 249-253.
3. "A two-node queue network with a maximum number of allowable Jobs, *Performance '83*, Agrawala and Tripathi (Eds.) pp. 33-44, North Holland, 1983.
4. "Analysis of a hybrid access protocol for voice and data traffic in local area networks environment," with A. A. Nilsson and Y. C. Liu, *Proceedings Milcom Conf. '85*, 1985.
5. "A comparison of three methods of estimation for approximating general distributions by a Coxian distribution." with T. Khoshgoftaar, *Proc. International Workshop on Modelling Techniques and Performance Evaluation*, Paris, March 9-11, 1987.
6. "Matrix-geometric solutions of open exponential queueing networks with blocking." with T. Altioek and R. Onvural, *Proc. International Workshop on Modelling Techniques and Performance Evaluation*, Paris, March 9-11, 1987.

7. "End-to-end analysis in a catenet environment," with U. Koerner, S.Fdida, and G. Shapiro, in: *Data Communication systems and their performance*, Moares, Souza e Silva, and Soares (Eds.) North-Holland, 1988, 441-452.
8. "Approximate analysis of arbitrary configurations of queueing networks with blocking and deadlock," with K.-P. Jun, in: *Queueing Networks with Blocking*, Perros and Altiok (Eds.) North-Holland, 1989, 259-280.
9. "On a multi-class queue with class dependent window-flow control," with R. Onvural, and U. Koerner, *Proc. Modelling Techniques and Tools for Computer Performance Evaluation*, Palma de Mallorca, Spain, September 1988, pp 245-264.
10. "Equivalencies between open and closed queueing networks with finite capacity," with R. Onvural, *Proc. International Seminar on Performance of Distributed and Parallel Systems*, Kyoto, Dec. '88. Award paper, appeared in *Perf. Eval. J.*
11. "Approximating General Distributions by a Uniform Coxian distribution" with T. Khoshgoftaar, *Proc. 20th Annual Pittsburgh conf. on Modelling and Simulation, Instrument Society of America*, 1989, 325-333.
12. On the Superposition of Arrival Processes for Voice and Data, with R. Onvural, *Proc. Fourth Int. Conf. on Data Communications Systems and their Performance*, Barcelona, June 20-22, 1990.
13. "Approximate analysis of tandem open queueing networks with general services and blocking", with R. Onvural, *Performance '90*, Edindurgh, 1990.
14. "Performance modelling of a shared buffer ATM switch architecture", with H. Yamashita, and S.-W. Hong in: Jensen and Iversen, eds., *Teletraffic and Datatrafic in a period of change (ITC-13)*, (North-Hollan, 1991) 993-998.
15. "Approximate analysis of a bufferless NxN synchronous Clos ATM switch", with A. Nilsson, and H.G. Perros, in: Coehen and Park, eds., *Queueing, Performance and Control in ATM (ITC-13)*, (North-Holland, 1991) 39-46.
16. "Performance issues in high speed networks", with R. Onvural, *TeleComm '91 Proceedings of technical symposium, part 2*, vol 2, pp.291-294, Geneva, Oct 10-15, 1991
17. "Queueing systems for modelling ATM networks", with G. Pujolle, in: Hasegawa, Takagi, and Takahashi, eds., *Performance of Distributed Systems and Integrated Communication Networks*, (North-Holland, 1992) 301-322.
18. "A queueing model of a bufferless synchronous Clos ATM switch with head-of-line priority and push-out", with A. Nilsson and F.-Y. Lai, *ICC '91*.
19. "Adaptive polling schemes for an ATM bus with bursty arrivals", with Karlsson and Viniotis, *ICC '91*

20. "Approximate analysis of an open multiclass queueing network with class-dependent population constraints", with Y. Dallery and G. Pujolle, *INFOCOM '92*, 968-977.
21. "Performance analysis of a multi-buffered Banyan ATM switch under bursty traffic", with T. Morris, *INFOCOM '92*, 436-445.
22. "Approximate analysis of a discrete-time tandem network of cut-through queues with blocking and bursty arrivals", with Morris, *Proc. of the Second International Workshop on Queueing Networks with finite capacity queues*, Research Triangle Park, NC, May 1992. Award paper, it appeared in *J. of Performance Evaluation*.
23. "Approximate analysis of discrete-time tandem queueing networks with customer loss", with D. Park, *Globecom '92*.
24. "Tools and methodologies for high speed network design", with A. Nilsson and D. Stevenson, *Integrated Broadband Communication Networks and Services Conference*, Copenhagen, April 1993.
25. "Performance of bus allocation policies for an ATM switch under bursty arrivals and correlated destinations", with A. Zaghloul and Y. Viniotis, *IEEE 1st Int. Symp. on Global Data Networking*, Cairo, Egypt, Dec. 1993, 37-44.
26. "Approximate analysis of a multi-class open queueing network with class blocking and push-out", with T. Atmaca and Y. Dallery, *MASCOTS '94*, Durham, North Carolina, Jan. 1994, (IEEE Computer Society Press, 1994), 90-95.
27. "m-MMBP characterization of the departure process of an m-MMBP/Geo/1/K queue" with Park, Labetoulle and Roberts (Eds.), *Proceedings of ITC 14*, 1994, 75-84.
28. "Analysis of traffic measurements in the VISTAnet Gigabit networking testbed", with A. Nilsson and H.-C. Kuo. *High Performance Networking 94 (HPN)*, Grenoble, France, June 1994, 313-323.
29. "Throughput analysis of stop-and-wait retransmission schemes for k-reliable multicast" with B. Kim and A. Nilsson. *LANs/MANs Conference*, Kyoto, Dec. 1994.
30. "A computationally efficient algorithm for characterizing the super-position of multiple heterogeneous interrupted Bernoulli processes", with K. Elsayed, *2nd International Workshop on Numerical Solutions of Markov Chains*, Raleigh, January 1995.
31. "On the effective bandwidth of arbitrary on/off sources" with K. El-sayed. *Proc. of Performance of Communication Networks '95*, Instabul, October 95.
32. "Throughput analysis of a selective repeat retransmission scheme for k-reliable multicast" with Bongtae Kim and A. Nilsson. *ICCC '95*.
33. "Statistical multiplexing with arbitrary on/off sources" with K. Elsayed, *Proc. IEEE Intl Performance, Computing, and Communications Conference*, Arizona, 1996.

34. "A lightweight software bus for prototyping problem solving environments" with R. Balay and M. Vouk. *Proc. 11th Intl Conference on Systems Engineering (ICSE 96)*, Las Vegas, July 9-11, pp: 626-630, 1996.
35. "k-reliable multicasting: throughput and delay analysis" with B. Kim and A. Nilsson. *ITC Seminar*, Lund University.
36. "Scheduling of multicast traffic in tunable-receiver WDM networks with non-negligible tuning latencies", with Z. Ortiz and G. Rouskas. *SIGCOM 97*, (ACM press, 1997) 301-310.
37. "The lightweight software bus: a message broker for prototyping problem solving environments" with R. Balay and M. Vouk. *ICCC '97*. France., pp 379-388.
38. "Scheduling combined unicast and multicast traffic in broadcast WDM networks", with Z. Ortiz and G. Rouskas, in: Korner and Nilsson (Eds): *Performance of Communication Networks '98*, (Chapman Hall, 1998), pp: 137-150.
39. "Queueing-Based Analysis of Broadcast Optical Networks", with M.W. McKinnon and G. Rouskas. *Sigmetrics/Performance'98*, (ACM Press, 1998) 121-130.
40. "A review of techniques for switching IP packets over ATM", with Guy Pujolle, *ICT '98*, Greece, 22-25 1998, pp: 305-309.
41. "A multi-layered queueing network model of a client-server system with synchronous and asynchronous messages", with S. Ramesh. *Workshop on Software Performance Engineering (WOSP)*, Santa-Fe, October 1998.
42. "Performance analysis of broadcast WDM networks under IP traffic, with M.W. McKinnon and G. Rouskas. *PERFORMANCE '99*, August 99, Instabul, Turkey.
43. "Blocking in wavelength routing networks, Part I: the single path case", with Y. Zhou and G. Rouskas, *INFOCOM '99* pp 321-328;
44. "Blocking in wavelength routing networks, Part 2: mesh topologies", with Y. Zhou and G. Rouskas, *ITC '99*
45. "Performance analysis of multi-class data transfer elements in soft real-time systems using semaphore queues", with C. Juiz and R. Puigjaner. *PERFORMANCE '99*, August 99, Instabul, Turkey, pending publication, CRC press.
46. "Computing blocking probabilities in multi-class wavelength routing networks", with S. Ramesh and G. Rouskas, *Networking 2000*, May 14-19, Paris, France.
47. "A comparison of allocation policies in wavelength routing networks" with Y. Zhou and G. Rouskas. *Photonics East 2000-SPIE*.

48. "Performance modeling of basic and priority pools in soft real-time systems" by C. Juiz, R. Puigjaner, and H. Perros, Second Conference on Simulation Methods and Applications (CSMA2000), Orlando, Florida, October 29-31, 2000.

Submitted papers

1. "A multi-layer client-server queueing network model with synchronous and asynchronous non-hierarchical messages", with S. Ramesh. Submitted to *Performance Evaluation J.*
2. "Computing call blocking probabilities in LEO satellite networks: The single orbit case" with H. Zaim and G. Rouskas, Submitted to INFOCOM 2001.

Papers presented in non-refereed conferences

a) Invited papers

1. "Approximate analysis of arbitrary exponential queueing networks with blocking," *ORSA/TIMS Conference*, Dallas, 1984.
2. "Approximate analysis of arbitrary exponential queueing networks with blocking," *Applied Probability Group Conference*, Williamsburg, January 1985.
3. "Modelling circuit-switching traffic in an integrated services environment," *IEEE Southeastern Conference*, March 31-April 3, Raleigh, 1985.
4. "Matrix-geometric solutions of exponential queueing networks with blocking," *ORSA/TIMS Conference*, Boston, April 1985.
5. "Multi-class queueing networks with blocking," *ORSA/TIMS Conference*, New Orleans, Spring 1987.
6. "Modelling multi-layered window-flow control mechanisms," *Third annual conference at Bilkent University*, Ankara, Turkey, June '88.
7. "A simulation model of a Picture Archival and Communication System," with V. D'Sylva and C. Stockbridge, *Proceedings SPIE Medical Imaging II*, Jan 1988, Newport Beach.
8. "An approximation analysis of a shared buffer ATM switch architecture under bursty arrivals" with Yamashita and Hong, *Proc. NATO workshop on High Speed networks*, Sophia-Antipolis, France, 1990.
9. "Approximate analysis of tandem open queueing networks with general services and blocking", with Onvural, *ORSA/TIMS Fall 1990*.
10. "Approximate analysis of a bufferless NxN synchronous Clos ATM switch", with Nilsson, and Lai, *Canadian National Conf. Computer Communication Systems*.

11. "Performance modelling of the shared buffer ATM switch architecture", with S.-W. Hong and H. Yamashita, *APORS '91*, Beijing, China, August, 1991.
12. "A discrete-time model of the shared buffer switch architecture", with S.-W. Hong and H. Yamashita, *Workshop on "Linear Algebra, Markov Chains, and Queueing Models"*, Institute for Mathematics and its Applications, January 13-17, 1992.
13. "Performance modelling of the leaky bucket," with Holtsinger, in: Perros (ed.), *High speed communication networks*, (Plenum, 1992).
14. "Approximate analysis of a discrete-time polling system with bursty arrivals" with Zaghloul, in: Perros, Pujolle, Takahashi (Eds) *Modelling and Performance Evaluation of ATM Technology* (Elsevier, 1993).
15. "Approximate analysis of a discrete-time polling systems", *TIMS, Alaska*, June 1994.
16. "k-reliable multicasting with selective-reject" with A. Nilsson, *Networld+Interop '94*, Paris, Oct. 1994.
17. "Analysis of open tandem queueing networks with population constraint and constant times" with Y. Rhee. *MASCOTS '95 and Festschrift in honor of Ed. Coffman*.
18. "ATM multiplexers with arbitrary arrival processes", with K. Elsayed, *European OR Soc.*, Israel, June 1995.

b) Non invited papers

1. "Queueing networks with finite queues: Split and merge configurations," *ORSA/TIMS Conference*, San Francisco, May 1984.
2. "A comparison of three methods of estimation for approximating general distributions by a Coxian distributions," *ORSA/TIMS conference*, Atlanta, November 1985.
3. "An efficient approximation algorithm for analyzing arbitrary open queueing networks with blocking," *Applied Probability Conference*, New Brunswick, Jan. 1987.
4. "Throughput analysis of closed queueing networks with finite buffers," *Applied Prob. Conference*, New Brunswick, Jan. 1987.
5. "On a multi-class queue with class dependent window-flow control mechanism," *Applied Probability Conference*, Chapel Hill, North Carolina, May '88.
6. "Approximate analysis of tandem configurations with blocking and general service times," *Applied Probability Conference*, Chapel Hill, North Carolina, May '88.

Books, Proceedings, and Special issues

1. *Queueing Networks with blocking: Exact and Approximate Solutions*, Oxford University Press, 1994. H.G. Perros. (A research monograph on queueing networks with blocking. 300 pages.)
2. *An introduction to ATM networks*, H.G. Perros. (A graduate/undergraduate textbook) - under preparation.
3. *Proc. First International Workshop on Queueing Networks with Blocking*, (North Holland, 1989) H.G. Perros and T. Altioik, Eds.
4. *High speed communication networks*. Proceedings of TriCom '92. (Plenum, 1992). H.G. Perros, Ed.
5. *Modelling and Performance Evaluation of ATM Technology* Proceedings of a workshop organized in Martinique (North Holland, 1993). G. Pujolle, H.G. Perros, Y. Takahashi, Eds.
6. *ATM networks and their performance*, Proceedings of an Int. Conf., organized in Raleigh. (North Holland, 1994). H.G. Perros and Y. Viniotis, Eds.
7. *Performance Evaluation J.*, special issue on: Queueing Networks with Finite Capacity Queues, 10 (1989), Guest Editors: I. Akyildiz and H.G. Perros.
8. *Annals of Operations Research*, vol 49, 1994: Special issue on: Methodologies for High Speed networks, Guest Editors: R. Onvural, H.G. Perros, and G. Pujolle.
9. *Performance Evaluation J.*, special issue on: ATM networks and their performance. Guest Editors: Y. Viniotis and H.G. Perros.
10. *Networking 2000*, Proceeding of Networking 2000, organized in Paris, France, May 14-19, 2000. (Springer-Verlag, 2000). Pujolle, Perros, Fdida, Korner, and Stavrakakis (Eds.)

Invited Talks

1. Trinity College Dublin, Ireland.
2. Institut fur Informatik, University of Bonn, West Germany.
3. Institut National de Recherche en Informatique et en Automatique.
4. Institut Universitaire de Technologie, Le Mans, France.
5. T. J. Watson IBM Research Center, Yorktown Heights, New York.
6. Computer Science Department, Boston University, Boston.
7. Operations Research Program, N. C. State Univ.
8. Electrical Engineering Dept., Columbia University.
9. University of Paris VI, France.
10. IRISA, Rennes, France.
11. Industrial Engineering Dept., Rutgers University.
12. Los Alamos Labs.
13. Harris Corporation, Melbourne, FL.

14. Northern Telecom, RTP, NC.
15. Digital Equipment Corp., Littleton, Mass.
16. AT&T, Holland, NJ.
17. IFIP W.G. 7.3 Meeting, Raleigh.
18. AMP, Inc., Harrisburg, PA.
19. IFIP WG 7.3 Meeting, Brussels, Belgium.
20. Dept. of Communication Systems, Lund University, Sweden.
21. Institut National de Telecommunication, Evry, France.
22. Ecole National Supérieur de Telecommunication, Paris.
23. Lab. MASI, Univ. Paris 6.
24. ETRI, Korea.
26. KAIST, Korea.
28. University of North Carolina, Chapel Hill.
29. Gigabit Testbed Workshop, Washington.
30. DARPA Networking Principal Investigator's meeting, Monterey.
31. BNR Atlanta Lab.
32. University of Carleton, Ottawa, Canada.
33. IBM, Raleigh.
34. University of Isles Balears, Spain.
35. Athens Polytechnic School, Greece.
36. BNR, Ottawa, Canada.
37. Lab. d'Automatic de Grenoble, France.
38. IEEE Comm. local Chapter.
39. Fujitsu Networks, Raleigh.
40. DPMA, Raleigh.
41. BNR, Richardson, TX.
42. INT, France
43. Rutgers Univeristy
44. Florida Central University

GRANTS

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|----|---|----------|
| 1. | Campus Research Board, Univ. of Illinois at Chicago,
six months (1/1/78 - 6/30/87). | \$3,000 |
| 2. | Center for Communications and Signal Processing, NC State Univ.,
"Voice, Video and data traffic in an integrated services environment,"
with W. Stewart, one year (7/1/83-6/30/84). | \$20,000 |
| 3. | Faculty of Physical and Mathematical Sciences, NC State Univ.,
"Networks of queues with blocking," Summer 1984. | \$2,500 |
| 4. | Center for Communications and Signal Processing, NC State Univ.,
"Performance modelling of distributed systems," with A. Nilsson,
one year (7/1/84-6/30/85). | \$43,000 |
| 5. | National Science Foundation, "Networks of queues with blocking," | |

	two years (7/1/85-6/30/87).	\$95,000
6.	Rome Air Development Center, "Performance metrics for local area networks," with A. Nilsson, one year (7/1/85- 6/30/86).	\$91,000
7.	Center for Communications and Signal Processing, NC State Univ., "Performance modelling of distributed systems," with A. Nilsson, one year (7/1/85-6/30/86).	\$43,000
8.	Center for Communications and Signal Processing, NC State Univ., "Modelling of gracefully degrading distributed systems," one year (7/1/85-6/30/86).	\$27,708
9.	Integrated Manufacturing Systems Engineering Institute, NC State Univ., "Performance modelling of production systems," one year (8/1/85-6/30/86).	\$13,000
10.	Center for Communications and Signal Processing, NC State Univ., "A queueing network with blocking and unreliable servers," one year (7/1/86-6/30/87).	\$27,708
11.	Center for Communications and Signal Processing, NC State Univ., "Performance modelling of distributed systems," with A. Nilsson, one-year (7/1/86-6/30/87).	\$43,000
12.	Center of Communications and Signal Processing, NC State Univ., "Architectural considerations of high speed networking," with A. Nilsson, one year (7/1/86-6/30/87).	\$35,000
13.	Integrated manufacturing Systems Engineering Institute, NC State Univ., "Performance modelling of production systems," 6 months (6/30/86-12/31/86).	\$8,500
14.	Center of Communications and Signal Processing, NC State Univ., "Performance modeling, architectures and protocols for communication systems", with A. Nilsson, one year (7/1/87-6/30/88)	\$97,000
15.	AIRMICS, grant awarded through the Center of Communications and Signal Processing, NC State Univ., "End-to end analysis and performance evaluation of complex communication systems," one year (5/1/87-5/31/88)	\$132,000
16.	National Science Foundation, "US-France cooperative research: parallel numerical algorithms,"with W. Stewart and R. Plemmons, two years (5/1/87-9/31/89)	\$10,000
17.	National Science Foundation, "Multi-class networks of queues with blocking," three years (8/1/87-2/28/89)	\$157,000

18.	National Science Foundation, "Travel grant for the first international workshop on queueing networks with finite capacity," one year (1/1/88-12/31/88).	\$12,000
19.	AT&T, grant awarded through the Center of Communications and Signal Processing, NC State Univ., "Performance modelling of PACS", with A. Nilsson, one year (7/1/87-6/30/88)	\$14,652
20.	Center of Communications and Signal Processing, NC State Univ., "Networking", with A. Nilsson, one year (7/1/89-6/30/90)	\$70,212
21.	Center of Communications and Signal Processing, NC State Univ., "Networking", with A. Nilsson, one year (7/1/90-6/30/91)	\$63,857
22.	DARPA, "Performance analysis for very high speed communication networks", three years (7/1/90-6/30/93)	\$250,000
23.	IBM, "Performance analysis of the leaky bucket and an error control scheme", one year (8/15/90-8/14/91)	\$36,584
24.	VISTAnet, "performance modelling for the gigabit network", three years (10/1/90-9/31/93), with A. Nilsson	\$380,000
25.	IBM, "Multi-class queueing networks with blocking", one year (7/1/91-6/30/92)	\$22,000
26.	Center of Communications and Signal Processing, NC State Univ., "Networking", with A. Nilsson, one year (7/1/91-6/30/92)	\$63,857
27.	Center of Communications and Signal Processing, NC State Univ., "Networking", with A. Nilsson, one year (7/1/92-6/30/93)	\$73,200
28.	IBM, "Survey, validation and development of analytic techniques and models of communication systems and protocols", with Viniotis, Perros, Nilsson, Stewart, two years (01/1/93 - 12/31/94)	\$376,196
29.	BNR, gift	\$17,000
30.	Center of Communications and Signal Processing, NC State Univ., "Networking", with A. Nilsson, one year (7/1/92-6/30/93)	\$39,684
31.	MCI, pre-contract spending money, with Nilsson.	\$30,000
32.	Center of Communications and Signal Processing, NC State Univ., "Networking", with A. Nilsson, one year (7/1/93-6/30/94)	\$39,684
33.	VISTAnet, "performance modelling for the gigabit network",	

	One year (10/1/93-6/31/95), with A. Nilsson	\$107,000
34.	IBM, "Switched Ethernet", One year (1/1/95 - 31/12/95) with A. Nilsson and M. Vouk.	\$50,000
35.	Computing and Advanced Communications Center, NC State Univ., "Networking", with A. Nilsson, one year (7/1/94-6/30/95)	\$40,000
36.	Computing and Advanced Communications Center, NC State Univ., "Networking", with A. Nilsson, one year (7/1/95-6/30/96)	\$40,000
40.	Computing and Advanced Communications Center, NC State Univ., "Performance study of messaging in CORBA", with M. Vouk, one year (7/1/96-6/30/97)	\$38,789
41.	Ericsson, "Traffic Shaping Analysis", with A. Nilsson, one year (1/1/97 to 12/31/97)	\$100,000
42.	Computing and Advanced Communications Center, NC State Univ., "Performance study of messaging in CORBA", with M. Vouk, one year (7/1/97-6/30/98)	\$38,894
43.	Computing and Advanced Communications Center, NC State Univ., "A performance study of real-time modelling of CORBA", with Injong Rhee, one year (7/1/98-6/30/99)	\$30,000
44.	NSF, "Performance analysis of wavelength routed wide area networks" with George Rouskas. Three years starting 9/1/98.	\$255,500
45.	IBM partnership award, 1999	\$40,000

TEACHING ACTIVITIES

Courses taught at the graduate and undergraduate level

Operating systems, Data Structures, Discrete Mathematics, Computer Networks, High Speed Networks, Simulation Techniques, Queueing Theory, Advanced Queueing Theory, Computer Performance Evaluation and Modelling, Survey of Operations Research, Introduction to Computer Science, Business Statistics, Linear Programming.

Supervised graduate research

Completed: 19 Ph. D and 8 M.S students (with thesis)
Currently supervising 3 Ph.D. students.
Post-doctoral students : 4 students for total of 5 years.
Visiting Scholars: 5 for a total of 5 years

PROFESSIONAL ACTIVITIES

Conferences/Workshops

- Program coordinator of an one-day conference on MIS, Univ. of Illinois at Chicago, December 9, 1977.
- Organized two sessions on Computer Performance Evaluation and Modelling at the *ORSA/TIMS conference in Chicago*, April 1983.
- Conference chairman of the *PERFORMANCE '86 and ACM SIGMETRICS '86*, a conference on Computer Performance Modelling, Measurement and Evaluation, NC State Univ., May 1986.
- Conference chairman of the *First International Workshop on Queueing Networks with Blocking*, held at NC State University, May '88.
- Conference Chairman of *The Third Triangle Conference on Computer Communications: High Speed Networks*, March 26-27, 1990, NC State University.
- Co-chairman of a *NATO sponsored workshop on High Speed Networks*, held at Sophia-Antipolis, France, June 1990.
- Conference Chairman of *The Fifth Triangle Conference on Computer Communications: High Speed Networks*, February 27-28, 1992, NC State University.
- Pre-conference tutorials for the *Fourth Int. Conf. on Data Communication and their Performance*, Spain, 1990, and *Performance '92*.
- Conference co-chairman of *Modelling and performance evaluation of ATM technology*. Martinique, France, Jan 25-27 1993.
- Conference co-chairman of the *Fifth Int. Conf. on Data Communication and their Performance*, North Carolina State University, October 1993.
- Pre-conference tutorials in *Seacom*, Kuala Lumpur, Malaysia, November 1994.
- Organizer of a *WG 6.3 workshop in St. Thomas*, January 1995.
- Pre-conference tutorial in *PCN '95*, Instabul, Turkey, October 1995.
- Program chairman of *Networking 2000*, a super-conference that combines three separate conferences. To be held in Paris, may 99.
- Program committee member and session chairman in numerous international conferences related to the performance of computer and communication systems

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Editorials

- Guest co-editor for a special issue of *Performance Evaluation J.* on "Queueing Networks with blocking".

- Guest co-editor for a special issue in the *Annals of OR* on "Methodologies for ATM networks".
- Guest co-editor for a special issue in the *Performance Evaluation J.* on: ATM networks and their performance.

Offices

- Chairman of *IFIP Working Group 6.3* on the Performance of Communication Systems.
- Member of *IFIP Working Group 6.4* on LANs/MANs.
- Member of *IFIP Working Group 7.3* on Performance Evaluation.
- Member of IEEE TC on Computer Communications.

Consulting/practical experience

1. J. Waddington Ltd., Leeds, England. A project was carried out during the summer of 1971 as part of my M. Sc. thesis. Objectives to model the manufacturing process of PLASTONA, a subsidiary of the above firm.
2. Aer Lingus-Irish, Dublin, Ireland. A project was carried out during 1982 as part of my Ph.D. thesis. Objectives: to study the performance of the disk I/O system which supported the real-time reservation system of the airline.
3. Goulding Buildings, Wicklow, Ireland. Consulting, 1974. Objectives: an investigation into material control with a view to constructing effective measure of control.
4. Continental Illinois National Bank, Chicago. Illinois. Consulting, Summer 1981. Objectives: to study the performance of an on-line system for Electronic Transfer of Funds.
5. Data General, Research Triangle Park, North Carolina. Consulting, 1983/84. Objectives: to study the performance of a prototype distributed system.
6. AMP Inc., Harrisburg, PA. Consulting, 1986. Objectives: to construct a simulation model of a manufacturing process.
7. Bell Northern Research, Research Triangle Park, North Carolina, Consulting, 1988-89. Objectives: to study the performance of a prototype switch and an ATM-bus.
8. Bell Northern Research, Ottawa, Consulting, 1993. Objectives: to provide a survey of the various call admission control mechanisms proposed for ATM networks.
9. Swedish Telecom (Telia), Since 1993, I teach a course on ATM networks twice a year.
10. Broadband Technologies, RTP. A simulation study of the CATV board. 1994

11. BNR, RTP. Software performance modelling. 1995-1996.
12. Yurie Systems. Performance modelling of a QoS scheduling algorithm for an ATM switch. 1997-1998.
13. Peracom. Performance modelling of Ethernet switches. 1998.